



## Review of *Campsicnemus* (Diptera: Dolichopodidae) of the Marquesas, French Polynesia, with description of four new species groups

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### Abstract

The Marquesan species of *Campsicnemus* are reviewed and four new species groups: the *gladiator* group (Marquesan gladiator flies), the *aa* group (Marquesan vowel flies), the *englundi* group (Marquesan silly-walk flies), and the *hihiroa* group (Marquesan eyelash flies) are defined. Twelve new species are described and illustrated: *Campsicnemus gladiator* Evenhuis, **n. sp.** (*gladiator* group); *C. aa* Evenhuis, **n. sp.**, *C. ee* Evenhuis, **n. sp.**, *C. ii* Evenhuis, **n. sp.**, *C. oo* Evenhuis, **n. sp.**, *C. uu* Evenhuis, **n. sp.** (all in the *aa* group); *C. englundi* Evenhuis, **n. sp.**; *C. cheesmanae* Evenhuis, **n. sp.**, *C. plautus* Evenhuis, **n. sp.**; (all in the *englundi* group); *C. dytei* Evenhuis, **n. sp.**, *C. hihiroa* Evenhuis, **n. sp.**, *C. taratara* Evenhuis, **n. sp.** (all in the *hihiroa* group). A key to all known French Polynesian species groups of *Campsicnemus* and to species within each species group in the Marquesas are given.

**Key words:** Marquesas, French Polynesia, *Campsicnemus*, species groups, keys, water-skaters, taxonomy

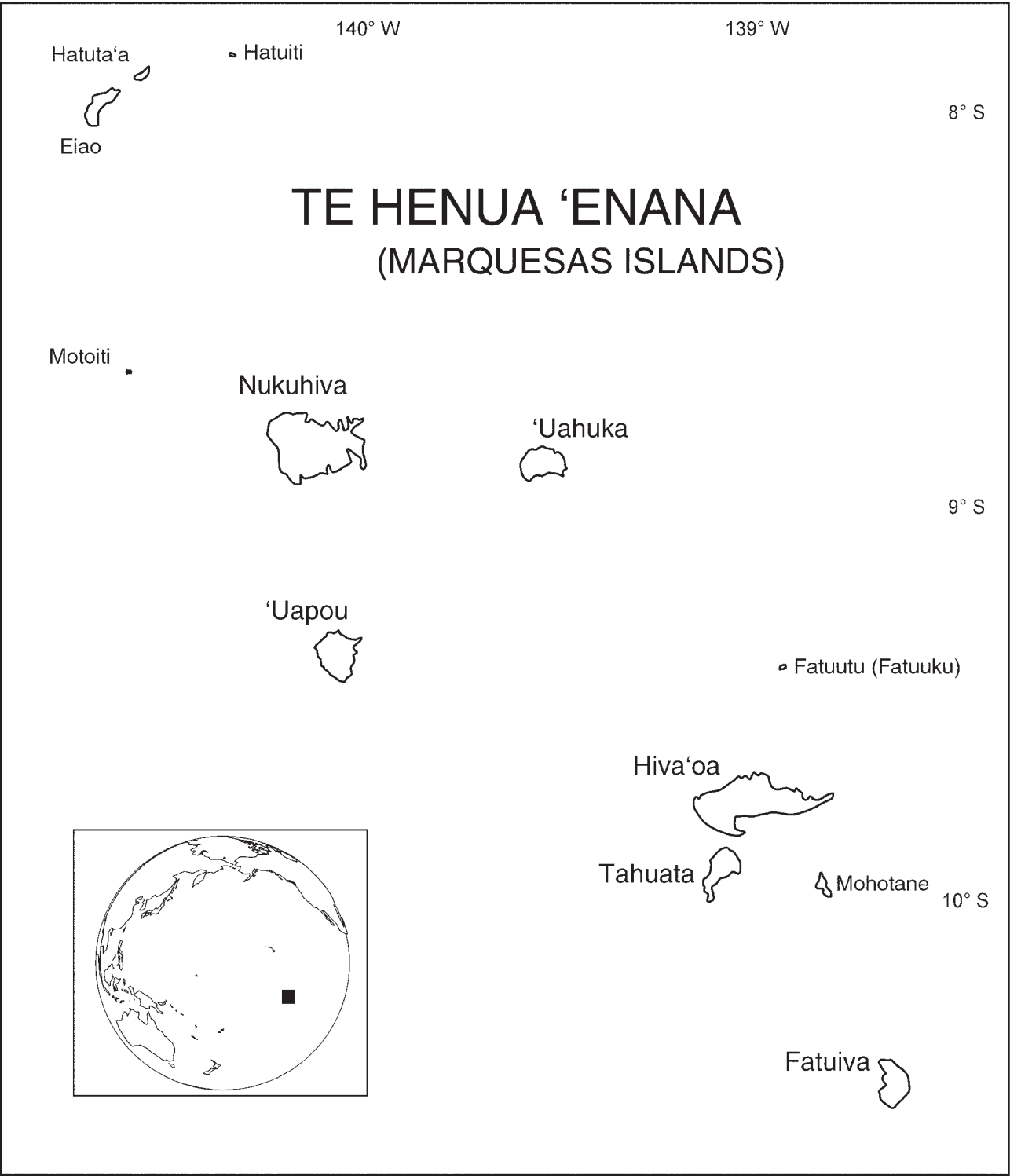
### Introduction

*Campsicnemus* Haliday is a widespread genus throughout the Northern Hemisphere but with an extremely high diversity of endemic species in the Hawaiian Islands and French Polynesia [see Evenhuis (2008) for more detailed background information]. Studies on Marquesan (See Fig. 1 for location of the French Polynesian Marquesan islands in the Pacific Ocean) *Campsicnemus* are few. Parent (1934) was the first to describe a water-skating *Campsicnemus* (*C. scurra*) from the Marquesas based on a specimen collected by Evelyn Cheesman on the *St. George* Expedition. More than sixty-five years later, Evenhuis (2000) described two additional new species of water-skaters (*C. limnobates* and *C. uncleremus*) from other islands in the Marquesas based on material collected on surveys conducted from 1999–2001 by Bishop Museum and the Smithsonian Institution. These two species (and *C. scurra* plus a new species described here) have been found to belong to a monophyletic species group only known from the Marquesas (this group is defined here as the *gladiator* group). Recently, Evenhuis (2008) described 10 new species from the Society Islands that belong to two species groups endemic to those islands (the *lobatus* group [5 species] and the *zigzag* group [5 species]), bringing the total of French Polynesian *Campsicnemus* known at that time to 13. Further material from the Marquesas collected during these various surveys have been examined and have been found to fall into four additional new species groups, based primarily on characters of the male legs.

The four species groups from the Marquesas (*aa*, *gladiator*, *englundi*, and *hihiroa*) are here keyed along with the two species groups from the Societies (*lobatus* and *zigzag*) to assist in their identification. Twelve new species discovered during this study are described and illustrated. In addition, keys to species in each species group are given. With the 12 new species described here, the French Polynesian *Campsicnemus* fauna now totals 25 species.

Specimens of *Campsicnemus* from throughout the Pacific are currently being studied as part of a larger

more comprehensive revisionary work and, as more specimens are examined and compared with others in the genus, they will be placed in other species groups as these are found and circumscribed. The new species here are described and named to allow for their inclusion in upcoming papers on the phylogenetic relationships of biodiverse Diptera in French Polynesia and the Hawaiian Islands.



**FIGURE 1.** Map of the Marquesas.

## Material and methods

Specimens studied derive primarily from material collected during surveys conducted in the Marquesas by the Bishop Museum and Smithsonian Institution from 1999–2001 and one collection during a trip to the Marquesas made by Doug Craig (University of Alberta) in 2000. Additionally, older material in the Bishop Museum, Honolulu (BPBM), collected by the Pacific Entomological Survey in 1929 and 1931, and collecting trips in 1977 (by S.L. Montgomery) and 1980 (by G. Paulay) were examined. Holotypes and paratypes are deposited in BPBM. Where length of series allows, paratypes are deposited in the National Museum of Natural History, Washington, D.C. (USNM). Specimen database numbers [BPBMxxxxxxx] are given in square brackets. The data for these databased specimens are held in the Essig Museum, University of California Berkeley.

Morphological terminology follows Evenhuis (2003); antennal terminology follows Stuckenberg (1999).

## Systematics

### *Campsicnemus* Haliday

*Camptosceles* Haliday, 1832: 357 (subgenus of *Medeterus*). Suppressed by I.C.Z.N. (1958: 349 [Opinion 531]).

*Leptopezina* Macquart, 1835: 554. Type species *Diastata gracilis* Meigen, 1820, by monotypy. *Nomen oblitum* (see Evenhuis 2003).

*Campsicnemus* Haliday in Walker, 1851: 187. Type species: *Dolichopus scambus* Fallén, 1823, by validation of I.C.Z.N. (1958: 351 [Opinion 531]). *Nomen protectum* (see Evenhuis, 2003).

Two named species groups of *Campsicnemus* are previously known from French Polynesia: the *lobatus* group (containing 5 species), and the *zigzag* group (containing 5 species) from the Society Islands (Evenhuis, 2008). Four additional groups containing species occurring in the Marquesas are described in this study: the *aa* group (common name: “Marquesan vowel flies”), the *englundi* group (common name: “Polynesian silly-walk flies”), the *gladiator* group (common name: “Marquesan gladiator flies”), and the *hihiroa* group (common name: “Polynesian eye-lash flies”). Other species from French Polynesia are currently under study and, in comparison to other known *Campsicnemus* in the Pacific including the Hawaiian Islands, will be placed in other species groups.

### Key to Species Groups of *Campsicnemus* in French Polynesia

(based on males)

1. Fore coxa with a cluster of three to 4 black setae subapically on anterior surface (directed forward) that appear to be fused together to form a thorn-like projection (Fig. 2); mid basitarsus shortened and with an apical spur of varying shapes or strong apical seta (Figs. 3–6) ... (Marquesas) ..... *gladiator* group
- Fore coxa without a modified cluster of setae; mid basitarsus not as above ..... 3
2. Mid femur with conspicuous ventral swellings and concavities with associated patches of strong setae (e.g., Figs. 14–16) ..... *englundi* group
- Mid femur normal in shape and without setae in patches as above ..... 2
3. Fore tibia with conspicuous hook-like or pad-like sclerotized protuberance apically (Figs. 23–27) ... (Marquesas) ..... *aa* group
- Fore tibia without such a protuberance apically (not to be confused with an apical tibial comb, which is not a sclerotized structure of the tibia) ..... 4
4. Mid basitarsus with conspicuously long, thick setae (Figs. 17–20) ... (Marquesas) ..... *hihiroa* group
- Mid basitarsus without such long setae ... (Society Islands) ..... 5
5. Wing with apical spot and/or band of infuscation on posterodistal portion; wing often falcate apically; mid femur without strong black setae of varying shapes on apical third of ventral surface ..... *obatus* group

- Wing without an apical spot or band of infuscation distally; mid femur with short, strong black setae of varying shapes on apical third of ventral surface..... *zigzag* group

## The Marquesan species groups of *Campsicnemus*

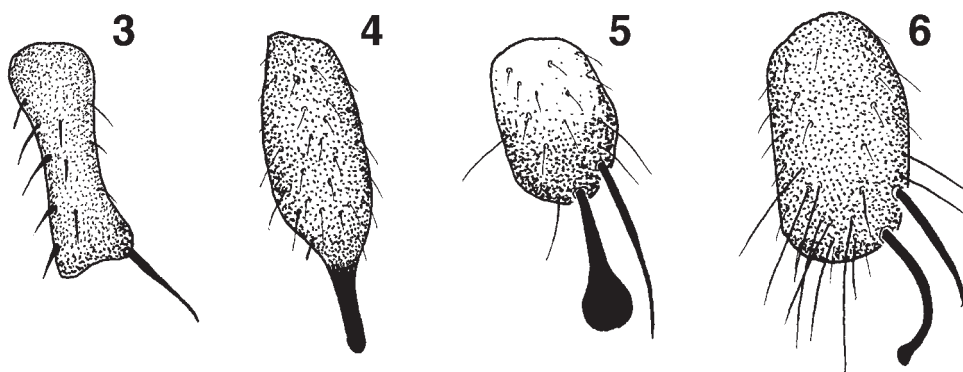
### The *gladiator* group

(Marquesan gladiator flies)

**Diagnosis.** The group is characterized by the male fore coxa possessing a cluster of strong black setae that appear fused together resembling a thorn (Fig. 2). No other species of *Campsicnemus* possess these “fused” setae.



FIGURE 2. *Campsicnemus gladiator*, n. sp., male fore coxa, lateral view, showing cluster of setae.



FIGURES 3–6. *Campsicnemus gladiator* group, male mid basitarsi. 3. *C. gladiator*, n. sp. 4. *C. limnobates* Evenhuis. 5. *C. scurra* Parent. 6. *C. uncleremus* Evenhuis.

**Remarks.** This group is comprised of water-skating species of *Campsicnemus* in the Marquesas. Species appear to be island endemics with one species per island harboring swift running water. Although no species of *Campsicnemus* are currently known from there, it is most likely that another species of this group will be found on Tahuata when water sources there are searched diligently.

Species of the *englundi* group another water-skating species group from Fatu Hiva and Hiva Oa in the Marquesas, are similar in appearance to species of the *gladiator* subgroup by virtue of the extremely long hairs on the hind femur, but the lack of the fore coxal thorn-like setal cluster (typical of the *gladiator* group) in combination with the bizarre shape of the mid femur with strong setae easily separate them from the *gladiator* group.

**Common name:** The name “Marquesan gladiator flies” refers to the characteristic thorn-like cluster of setae on the fore coxa that are reminiscent of the spiked weaponry of Roman gladiators.

**Included species:**

*gladiator* Evenhuis, **n. sp.** (Marquesas [Ua Pou]; holotype ♂ in BPBM, examined).

*limnobates* Evenhuis, 2000: 293 (Marquesas [Ua Huka]; holotype ♂ in USNM, examined).

*scurra* Parent, 1934: 299 (Marquesas [Nuku Hiva]; holotype ♂ in BMNH).

*uncleremus* Evenhuis, 2000: 294 (Marquesas [Hiva Oa]; holotype ♂ in BPBM, examined).

**Key to species in the *gladiator* subgroup**

(based on males)

1. Mid basitarsus one-half length of second tarsomere, with an apical spur of varying shapes (Figs. 3–6); pleura predominantly brown, yellow, if present, restricted to lower sclerites ..... 2
- Mid basitarsus three-fourths length of second tarsomere, without an apical spur but thick apical seta present (Fig. 2); pleura predominantly yellow, brown only on anepimeron ... (Ua Pou) ..... *gladiator* Evenhuis, **n. sp.**
2. Pleura entirely brown to black, no yellow present on sclerites; IIt1 with single strong spur dorsoapically (Fig. 4) ... (Nuku Hiva). ..... *scurra* Parent
- Pleura with some yellow on lower sclerites; IIt1 with more than one modified seta dorsoapically ..... 3
3. Anepisternum dark brown to black, no yellow present; IIt1 with small dorsoapical seta curved 90° and associated strong setae-like spur (Fig. 5) ... (Hiva Oa) ..... *uncleremus* Evenhuis
- Anepisternum brown dorsally, yellow ventrally; IIt1 with strong dorsoapical spatulate setae and associated strong setae (Fig. 3) ... (Ua Huka) ..... *limnobates* Evenhuis

***Campsicnemus gladiator* Evenhuis, new species**

(Figs. 2–3, 11)

**Diagnosis.** Easily distinguished from the other members of the *gladiator* subgroup by the lack of a conspicuous modified spur apically on the male mid basitarsus (present in various shapes in *C. limnobates*, *C. scurra*, and *C. uncleremus*) and the apical insertion of IIt2 onto IIt1 (insertion is subapical in the other species).

**Description. Male.** Body length: 2.5–2.8 mm. Wing length: 2.2–2.5 mm.

**Head.** Black, face dark brown to black with reddish highlights, brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; scape length ca. 2.5 x length of pedicel; postpedicel long, arrow-shaped, thin apically, length about 3.5 x width; arista slightly longer than head height.

**Thorax:** Mesoscutum and scutellum, brown, dark brown dorsomedially on mesonotum, with a few metallic greenish highlights laterally; pleura yellow except brown anepimeron; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem white, knob dark brownish black.



*Legs*: CI yellowish white, with apical tuft of three strong black setae, approximate basally, almost fused apically so as to appear as a single strong seta; CII and CIII brown, slightly paler than surrounding pleura; FI and FII yellowish brown, FIII yellowish brown basally, becoming darker brown on apical one-fourth; remainder of legs brown; FI and remainder of foreleg unmodified, without MSSC; FII slightly bowed with strong chetae basally, setae thinner toward apex, with subapical brown patch (sensory area?) harboring two small setae; FIII slightly bowed, middle of FIII bearing very long curved, sinuous, and wrinkled setae on ventral surface (MSSC); TiII slightly bowed, thin basally, swollen on apical half, with long setae in middle on dorsal surface (MSSC), smaller black setae and hairs along entire ventral surface. TiIII with row of stiff long hairs basoventrally, dorsal surface with small hairs and only two long setae (one subbasally; the other near middle) (MSSC). IIt1 (Fig. 3) short, about three-fourths length of IIt2, with single strong black, lateroapical seta (MSSC); IIt2 inserted apically on IIt1. Remainder of leg segments without MSSC.

*Wing*: pale smoky throughout; posterior crossvein perpendicular to vein M.

*Abdomen*. Brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites paler brown than tergites. Hypopygium brown with paler brown cerci, not dissected.

**Female**. As in male except for lack of MSSC; postpedicel subconical, length subequal to width; legs normal, without modifications; FI and FII brown.

**Types**. *Holotype* ♂ (BPBM Type 16,633) [BPBM1013183] and 5♂ [BPBM1013184] *paratypes* from FRENCH POLYNESIA: **Marquesas**: UA POU: Paeoa River, 1150–1500 ft [350–457 m], 17 Aug 2001, pools/cascades, R.A. Englund. *Other paratypes*: FRENCH POLYNESIA: **Marquesas**: UA POU: 24♂ [BPBM1013185], 19♀ [BPBM1013186], Upper Paeoa River, 1200 ft [366 m], 12 Aug 2001, skating on pools, D.A. Polhemus; 5♂ [BPBM1013187], 11♀ [BPBM1013188], Middle Paeoa River at road, 650 ft [198 m], 9°24'01"S, 140°03'30"W, skating on stream pools, 19 Aug 2001, D.A. Polhemus; 3♂ [BPBM1013189], 2♀ [BPBM1013190], Pouaoa River cascade, 400 ft [122 m] (see Fig. 11), 9°25'15"S, 140°05'27"W, skating on stream pools, 18 Aug 2001, D.A. Polhemus; Upper Anakooma River, 1100–1300 ft [335–396 m], 9°23'36"S, 140°03'49"W, skating on stream pools, 19 Aug 2001, D.A. Polhemus. Holotype in BPBM. Paratypes in BPBM and USNM.

**Etymology**. The specific epithet derives from the Latin *gladiator* = “swordsmen”; referring to an anthropomorphic similarity of this species possessing a spike-like cluster of setae on the fore coxae of males as if it were ready to go into battle like a gladiator.

### ***Campsicnemus limnobates* Evenhuis** (Fig. 4)

*Campsicnemus limnobates* Evenhuis, 2000: 293. Yang *et al.* 2006: 461 [incorrectly giving the type locality as “USA: Hawaiian Islands”].

**Diagnosis**. This species is easily distinguished from the others in the *gladiator* group by the mid and hind femora possessing long setae and cilia on their apical halves; and IIt1 possesses a single strong spatulate seta apically. It is separated from *C. scurra* and *C. uncleremus* by the yellow on the lower portion of the anepisternum (all brown in *C. scurra* and *C. uncleremus*).

**Redescription**. *Male*. Body length: 2.15–2.62 mm. Wing length: 2.46–2.89 mm.

*Head*. Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about two-thirds length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel long, lanceolate, length about 3.5 x width; arista slightly longer than head height.

*Thorax*: Mesoscutum, scutellum, dark brown, with a few metallic greenish highlights laterally; pleura

dark brown to brown except for yellow on the following sclerites: anepisternum, katapisternum, meron, and anepimeron; katetergite black; thoracic setae black: 4 dc; 2 np; 2 ph; 1 pa; 1 sc; ac absent; halter stem white, knob dark brownish black.

**Legs:** CI yellowish white, with apical tuft of three strong black setae, approximate basally, almost fused apically so as to appear as a single strong seta; CII mostly brown, some yellow anteriorly; CIII brown, slightly paler than surrounding pleura; FI and FII yellowish brown, FIII yellowish brown basally, becoming darker brown on apical one-fourth; remainder of legs brown; TiI yellow ventrally, brown dorsally, with long black seta subapically on ventral surface (MSSC); FI and remainder of foreleg unmodified, without MSSC; FII slightly bowed with medium sized setae basally, with subapical brown patch harboring two small setae; FIII slightly bowed with swollen basal area containing 2 small black setae and 1 long setae, middle of FIII swollen, containing very long curved (basalmost), wrinkled (medial), and straight (apicalmost) setae on ventral surface (MSSC); TiII slightly bowed and greatly swollen just beyond middle, with long hairs medially on dorsal surface, short hairs along ventral surface (MSSC). TiIII unmodified, without MSSC. IIt1 yellowish basally, blackish apically, short, about one-third length of IIt2, with strong black, spatulate apical seta and single associated strong black seta (MSSC). Remainder of leg segments without MSSC.

**Wing:** pale smoky throughout.

**Abdomen.** Dark brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites yellowish brown. Hypopygium brown with paler brown cerci, not dissected.

**Female.** As in male except for lack of MSSC; postpedicel length about 1.5 x width; legs normal, without modifications; FI and FII brown.

**Types.** Holotype ♂, FRENCH POLYNESIA: **Marquesas Is:** UA HUKA: Vaiee Cascade on Vaipae River, 700 ft [213 m], water temp. 22.5 °C, 8°53'52"S, 139°33'17"W, skating on pools, 3 Nov 1999, D.A. Polhemus (USNM). **Paratypes:** FRENCH POLYNESIA: **Marquesas Is:** UA HUKA: 1 ♂, 5 ♀, same data as holotype (BPBM, USNM); 6 ♂, 2 ♀, Vaihonu Cascade and rocky streams in upper Hane Valley, 500 ft [152 m], water temp. 23 °C, 8°54'50"S, 139°32'15"W, 1 Nov 1999, skating on pools, D.A. Polhemus (BPBM, USNM).

**Discussion.** This species is a water skater found on pools and streams in the southern portion of the island of Ua Huka at elevations from ca. 150–215 m [500–700 ft].

### ***Campsicnemus scurra* Parent** (Figs. 5, 8)

*Campsicnemus scurra* Parent, 1934: 299. Bickel & Dyte, 1989: 412; Evenhuis, 2000: 290, 2004: 41 (fig. 11); Yang *et al.*, 2006: 467.

**Diagnosis.** This species is easily distinguished from the other species in the *gladiator* group by the mid and hind femora possessing long setae and cilia on their apical halves; and IIt1 possessing a single strong apical spur.

**Redescription.** *Male.* Body length: 2.11–2.45 mm. Wing length: 2.44–2.69 mm.

**Head.** Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel long, lanceolate, length about 3.5 x width; arista slightly longer than head height.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to black throughout, with a few metallic greenish highlights laterally; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem white, knob dark brownish black.

**Legs:** CI yellowish white, with apical tuft of three strong black setae, approximate basally, almost fused apically so as to appear as a single strong seta; CII and CIII brown, slightly paler than surrounding pleura; FI

and FII yellowish brown, FIII yellowish brown basally, becoming darker brown on apical one-fourth; remainder of legs brown; FI and remainder of foreleg unmodified, without MSSC; FII slightly bowed with strong chetae basally, setae thinner toward apex, with subapical brown patch (sensory area?) harboring two small setae; FIII slightly bowed with swollen basal area containing 3–4 medium sized black setae and two long setae more apically, middle of FIII not swollen, containing very long curved, sinuous, and wrinkled setae on ventral surface (MSSC); TiII slightly bowed and swollen medially, with long setae in middle on dorsal surface (MSSC), smaller black setae and hairs along entire ventral surface. TiIII with long hairs basoventrally, dorsal surface with small hairs and only two long setae (one subbasally; the other near middle) (MSSC). IIt1 short, about one-half length of IIt2, with single strong black, blunt apical seta (MSSC). Remainder of leg segments without MSSC.

*Wing*: pale smoky throughout.

*Abdomen*. Dark brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites yellowish brown. Hypopygium brown with paler brown cerci, not dissected.

**Female**. As in male except for lack of MSSC; postpedicel length about 1.5 x width; legs normal, without modifications; FI and FII brown.

**Material examined**. FRENCH POLYNESIA: **Marquesas Is**: NUKU HIVA: 2 ♀, middle Hakaui Valley, 300 ft [91 m], on small pool of streamlet tributary to upper midreach, 8°54'46"S, 140°09'52"W, 19 Oct 1999, R. Englund (BPBM); 10 ♂, 2 ♀, same data except D.A. Polhemus (BPBM, USNM); 2♂, 3♀, tributary to upper Taipivai River, 1600 ft [488 m], water temp. 21.5 °C, 8°52'53"S, 140°07'03"W, on pools, 22 Oct 1999, D.A. Polhemus (BPBM, USNM); 1♂, 8♀, Taipi Valley, Tehua Falls, 500 ft [152 m], water temp. 23 °C, 8°52'14"S, 140°06'16"W, above rocks in rapids, 18 Oct 1999, D.A. Polhemus (BPBM, USNM); 2♂, streamlet crossing road above Taiohae, 1250 ft, water temp. 23 °C, 8°53'21"S, 140°06'25"W, skating on pools, 18 Oct 1999, D.A. Polhemus (USNM); 5♂, 2♀, Haaotupa Bay Stream, 8.9194°S, 140.1178°W, 17 Oct 2000, D.A. & R.E.G. Craig (BPBM); 9♂, 5♀, Taipi, 500 ft [152 m], 22 Aug 2001, R. Englund (BPBM); 6♂, 3♀, Stream on S. side Tekau Ridge, 2700 ft [823 m], 25 Aug 2001, R. Englund (BPBM). [Type in MNHN not examined.]

**Discussion**. This water skater is found in many parts of the southern portion of the island of Nuku Hiva on pools associated with a wide variety of streams and at various elevations from ca. 90–490 m [300–1600 ft].

Evelyn Cheesman collected this species, which Parent (1934) described. The species is only known from a single male and the data given by Parent “Marquesas Is. Nuka-hiva. St. Georges Exp. L.E. Cheesman (B.M.)” gives no indication of the specific locality on the island where it was captured nor on what date it was collected. The list of Diptera from French Polynesia collected during this expedition published by Aubertin & Cheesman (1929), gives no specific locality data for any of the species collected on Marquesan Islands during that expedition. However, Cheesman (1932) helps somewhat by giving a detailed account of her travels on Nuku Hiva during the St. George Expedition.

The *St. George*, a 191-foot three-masted barquentine yacht of 694 tons gross, initially landed at the southeastern port of Taipivai on Nuku Hiva in the latter half of January 1925 and stayed only a short time in order to sail on to Hakaui, a port further west on the island. Cheesman was primarily interested in seeing the “desert” region of the western portion of the island (labeled as “Le Desert” on maps of the islands she had seen), but decided to debark at Taipi[vai] to collect. She hiked up Taipivai Valley the first day and, instead of returning to the ship, decided to hike from Taipivai to Hakaui (a 9-hour hike) to arrive a day before the ship was due to arrive. After her day-long hike and reconnoitering with the *St. George*, she hiked the next day up the Hakaui Valley and climbed the cliffs on its west side (about a 1600-foot climb) in order to finally see the “desert” region, only to be disappointed. It was not a desert at all, but grassy plain that she said was “without anything that would attract insects”.

From her 1932 account, she only mentioned collecting insects in pools and small creeks while hiking along the knife-edged ridge above Hakaui. It is thus possible to delimit the capture of the type specimen of *Campsicnemus scurra* to most probably the pools or creeks in the area near the Hakaui River (see Fig. 8) from 23–25 January 1925 [the *St. George* left Hakaui on 25 January after a three-day anchorage there (Douglas & Johnson 1926)].



## ***Campsicnemus uncleremus* Evenhuis**

(Figs. 6, 7, 12)

*Campsicnemus uncleremus* Evenhuis, 2000: 294. Yang *et al.* 2006: 468 [incorrectly giving the type locality as “USA: Hawaiian Islands”]

**Diagnosis.** This species is easily distinguished from the other species in the *gladiator* group by the mid and hind femora possessing long setae and cilia on their apical halves; and IIt1 possesses a single strong apical seta curved 90 degrees.

**Redescription.** *Male.* Body length: 2.13–2.35 mm. Wing length: 2.45–2.70 mm.

*Head.* Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel triangular in shape, about 1.5 x width; arista slightly longer than head height.

*Thorax:* Mesoscutum, scutellum, dark brown, with a few metallic greenish highlights laterally; pleura dark brown to brown except for yellow on the following sclerites: middle of katapisternum and anepimeron; katetergite black; thoracic setae black: 4 dc; 1+1 np; 2 ph; 1 pa; 1 sc; ac absent; halter stem white, knob dark brownish black.

*Legs:* CI yellowish white, with apical tuft of three strong black setae, approximate basally, almost fused apically so as to appear as a single strong seta; CII and CIII brown, slightly paler than surrounding pleura; FI and FII yellowish brown, FIII yellowish brown basally, becoming darker brown on apical one-fourth; remainder of legs brown; FI and remainder of foreleg unmodified, without MSSC; FII slightly bowed with strong chetae basally, setae primarily absent apically, with subapical brown patch harboring two long setae; FIII bowed with swollen basal area containing 2–3 medium sized black setae and 1 long seta more apically, middle of FIII swollen, containing very long wrinkled (basalmost) and slightly curved and straight (apicalmost) setae on ventral surface (MSSC); TiI slightly bowed and swollen medially, with long setae in middle on dorsal surface (MSSC), black setae and hairs along entire ventral surface, longest just beyond middle of TiII. TiIII with long hairs basoventrally, dorsal surface with small hairs and 1 long seta subbasally (MSSC). IIt1 short, about one-third length of IIt2, with single strong black setae curved 90 degrees and associated strong black seta, (MSSC). Remainder of leg segments without MSSC.

*Wing:* pale smoky throughout.

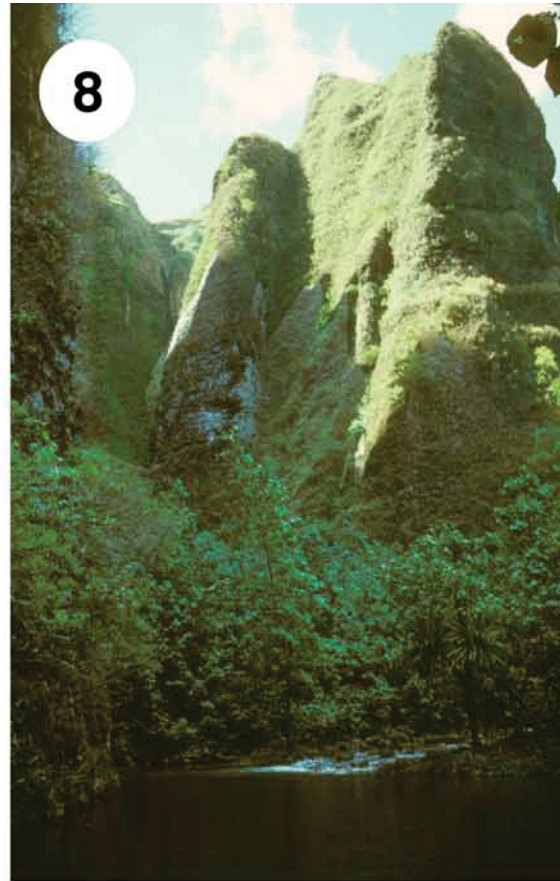
*Abdomen.* Dark brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites yellowish brown. Hypopygium brown with paler brown cerci, not dissected.

**Female.** As in male except for lack of MSSC; legs normal, without modifications; FI and FII brown.

**Material examined.** Types. *Holotype* ♂, FRENCH POLYNESIA: **Marquesas Is:** Hiva Oa: Taaoa Valley, 600–800 ft [183–244 m], riffle splash zone, 24 Oct 1999, R. Englund (BPBM Type 16,209). *Paratypes:* FRENCH POLYNESIA: **Marquesas Is:** Hiva Oa: 3♂, 3♀, same data as holotype (BPBM, USNM); 6♂, 1♀, Atikoua Stream, upper Atuona Valley, 500 ft [152 m] (see Fig. 7), water temp. 23.5 °C, 9°47'06"S, 139°03'11"W, on stream pools, 24 Oct 1999, D.A. Polhemus (BPBM, USNM); 13♂, 5♀, springs and rocky stream at headwaters of east fork of Faakua River, 1850 ft [564 m], water temp. 22 °C, 9°45'52"S, 139°59'00"W, skating on stream pools, 25 Oct 1999, D.A. Polhemus (BPBM, USNM); 4♂, 5♀, same data except J.T. Polhemus (BPBM, USNM).

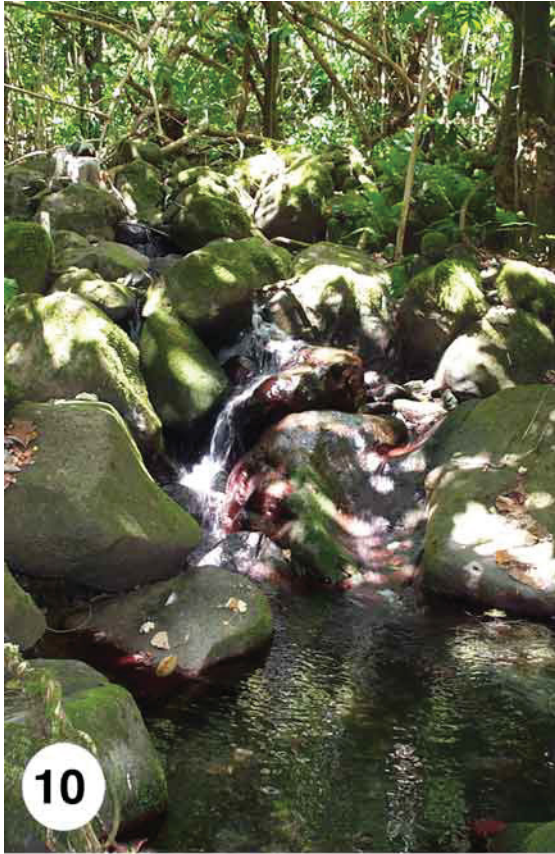
**Other Material Examined.** FRENCH POLYNESIA: **Marquesas Is:** Hiva Oa: 3♂, 2♀, Atuona Valley, Vaiao River, 1040 ft [317 m], 30 Aug 2001, pools/riffles, R. Englund (BPBM) (see Fig. 12); 2♂, Atikoua [Stream], 340 ft [104 m], 12 Aug 2001, R. Englund (BPBM); 8♂, 8♀, Cascade on upper Vaioa River, Atuona Valley, 1050 ft [320 m], 9°47'07"S, 139°03'59"W, skating on stream, D.A. Polhemus (BPBM, USNM).

**Discussion.** This species is a water skater found in pools of streams in the southern portion of the island of Hiva Oa at elevations from 104–565 m [ca. 340–1850 ft].



**FIGURES 7–9.** Marquesan habitats. **7.** Hiva Oa, Upper Atuona Valley, Atikoua Stream: type locality for *Campsicnemus plautus*, **n. sp.** and habitat for *C. uncleremus* Evenhuis. Collector Dan Polhemus in foreground. **8.** Nuku Hiva, Hakaui River: probable type locality for *C. scurra* Parent. **9.** Ua Huka, Hitikau Ridge. Inset: collector Dan Polhemus fogging on ridge summit: habitat for *C. uu*, **n. sp.**





**FIGURES 10–13.** Marquesan habitats. **10.** Fatu Hiva, Omoa River: type locality for *Campsicnemus cheesmanae*, **n. sp.** and *C. englundii*, **n. sp.** **11.** Ua Pou, Pouaoa River: habitat for *C. gladiator*, **n. sp.** **12.** Hiva Oa, Vaiao River: habitat for *C. uncleremus* Evenhuis and *C. dytei*, **n. sp.** **13.** Hiva Oa, Mt. Temetiu: habitat for *C. hihiroa*, **n. sp.** and *C. taratara*, **n. sp.**

## The *englundi* group

(Polynesian silly-walk flies)

**Diagnosis.** Species in this group are easily recognized by the conspicuously modified mid femur with large swollen area(s) ventrally combined with dense and stiff vestiture on those protuberances. Three species are here described from the Marquesas.

**Common name:** The common name “Polynesian silly-walk flies” refers to the extreme modifications of the shape of the mid femur and mid tibiae, which causes the legs to be positioned in a bandy-legged fashion (the same bandy-legged posture is found in the Hawaiian *C. charliechaplini* Evenhuis, which was named for Charlie Chaplin, who was characterized for his silly bandy-legged walking).

### Included species:

*cheesmanae* Evenhuis, **n. sp.** (Marquesas [Fatu Hiva] ; holotype ♂ in BPBM, examined).

*englundi* Evenhuis, **n. sp.** (Marquesas [Fatu Hiva] ; holotype ♂ in BPBM, examined).

*plautus* Evenhuis, **n. sp.** (Marquesas [Hiva Oa] ; holotype ♂ in BPBM, examined).

## Key to species in the *englundi* group

(based on males)

1. Mid tibia with scattered long, thick setae (Fig. 15); mid femur with prominent projection on apical one-third bearing tuft of short setae (Fig. 15)..... *englundi* Evenhuis, **n. sp.**
- Mid tibia with setae not long and scattered; mid femur shaped otherwise..... 2
2. Mid tibia sinuous, with short dense setae in three patches (Fig. 14); mid basitarsus unmodified, about same width as other tarsomeres..... *cheesmanae* Evenhuis, **n. sp.**
- Mid tibia straight, with uniform short setae on anterior surface and long setae on basal half of posterior surface (Fig. 16); mid basitarsus distinctly flared apically (Fig. 16)..... *plautus* Evenhuis, **n. sp.**

## *Campsicnemus cheesmanae* Evenhuis, **n. sp.**

(Figs. 10, 14)

**Diagnosis.** Can be separated from members of the *englundi* group by the three dense patches of short setae on the mid tibia (scattered long setae or uniformly short and long setae in *plautus* and *englundi*), and the unmodified mid basitarsus (wider apically than other tarsomeres and/or flared in the other species in the *englundi* group).

**Description. Male.** Body length: 2.9–3.4 mm. Wing length: 2.5–2.6 mm.

**Head.** Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel short, conical, length about 1.5 x width; arista slightly longer than head height.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to black throughout, with a few metallic greenish highlights laterally; thoracic setae black: 1 + 4 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem white, knob dark brownish black.

**Legs:** CI diffuse brown basally, yellowish on apical one-third; remainder of legs (except yellow venter of FI) brown; foreleg unmodified, without MSSC; FII (Fig. 14) with strong, swollen area ventrally bearing rows of strong, stiff black setae mesally and ventrally, small patch of 3–4 strong, long black setae at extreme base, and with small subapical protuberance bearing single seta; FIII as in *C. gladiator*, with 6–7 long setae on ventroapical surface (MSSC); TiII (Fig. 14) slightly sinuous and slightly swollen on basal fourth, with long setae on basal half on dorsal surface, sparse strong, stiff black setae on ventral surface, and dense patch of



short, stiff, blunt setae on apical fourth of dorsal surface (MSSC), a few smaller black setae and hairs along medial portion of ventral surface; tiny spicules densest medially, becoming sparse in single row apically. TiIII with dense patch of strong stiff setae subbasoventrally, slightly curved apically, becoming shorter apically, dorsal surface with small hairs and only two long setae (one subbasally; the other near middle) (MSSC). Ilt1 (Fig. 14) short, about one-fourth length of Ilt2; Ilt2 inserted apically on Ilt1. Remainder of leg segments without MSSC.

*Wing*: pale smoky throughout; posterior crossvein perpendicular to vein M.

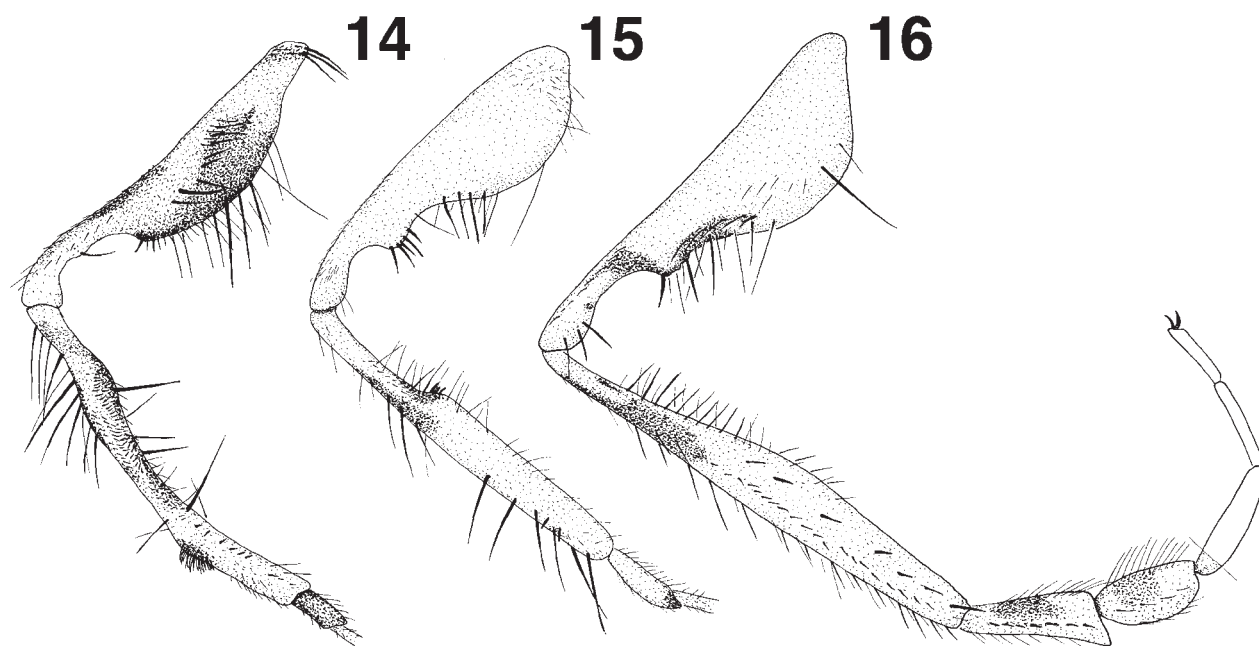
*Abdomen*. Brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites pale brown. Hypopygium brown with paler brown cerci, not dissected.

**Female**. Unknown.

**Remarks**. Females were collected at some of the localities, but since other species of *Campsicnemus* were collected with *C. cheesmanae*, it was impossible to associate females of any of the species at these localities and cannot be included in the material examined.

**Types**. *Holotype* ♂ (BPBM Type 16,636) [BPBM1013169] and 13 ♂ [BPBM1013170] *paratypes* from FRENCH POLYNESIA: **Marquesas**: FATU HIVA: Omoa [River], 1000–1320 ft [328–402 m], 28 Aug 2001, cascades/pools, R.A. Englund (see Fig. 10). *Other paratypes*: FRENCH POLYNESIA: **Marquesas**: FATU HIVA: 10 ♂ [BPBM1013171], north branch Omoa [River], 400–500 ft [122–152 m], 28 Aug 2001, riffles/pools, R.A. Englund; 12 ♂, Upper Omoa River, 1.6 mi [1 km] above Omoa, 10°30'31"S, 138°39'46"W, 26 Aug 2008, skating on surface of stream pools, D.A. Polhemus. Holotype in BPBM. Paratypes in BPBM and USNM.

**Etymology**. The specific epithet honors the late L. Evelyn Cheesman for her incredible collecting efforts in French Polynesia and elsewhere in the Pacific.



**FIGURES 14–16.** *Campsicnemus englundii* group, male midlegs. **14.** *C. cheesmanae*, **n. sp.**, femur, tibia, and basitarsus. **15.** *Campsicnemus englundii*, **n. sp.**, femur, tibia, and basitarsus. **16.** *Campsicnemus plautus*, **n. sp.**, femur, tibia, and all tarsi, showing flared basitarsus and swollen second tarsomere.

### *Campsicnemus englundii* Evenhuis, new species

(Figs. 10, 15)

**Diagnosis**. Most similar in appearance to *C. plautus*, **n. sp.** but can be easily distinguished by the mid



basitarsus thick but not flared apically (mid basitarsus flared in *C. plautus*) and by the scattered strong setae on the mid tibia (setae of uniform length on the anterior surface and longer and denser on the basal third of the posterior surface in *C. plautus*).

**Description. Male.** Body length: 2.2–2.4 mm. Wing length: 2.1–2.6 mm.

**Head.** Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel long, lanceolate-conical, length about 3 x width; arista slightly longer than head height.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to black throughout, with a few metallic bluish highlights dorsolaterally; thoracic setae black: 1 + 4 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem white, knob dark brown.

**Legs:** CI and FI yellowish; remainder of legs brown; foreleg unmodified, without MSSC; FII (Fig. 15) with strong, swollen area ventrally bearing 4–5 strong, stiff black setae ventrally, patch of brown hairs basally; with prominent protuberance on apical one-third bearing small patch of short slightly curved black setae; FIII as in *C. gladiator*, with 7–8 long setae on ventroapical surface (MSSC); TiII (Fig. 15) thin basally, slightly swollen on apical two-thirds, with 6 strong black setae on apical third on dorsal surface, small patch of stiff black setae on mesal surface at point where thickness of tibia starts (MSSC), a few smaller fine black setae and hairs along medial third of mesal surface. TiIII with row of long stiff setae on basal half, becoming shorter apically, dorsal surface with small hairs and only two long setae (one subbasally; the other near middle) (MSSC). IIt1 (Fig. 14) short, broad, shield-like apically, about one-half length of IIt2; IIt2 inserted apically on IIt1. Remainder of leg segments without MSSC.

**Wing:** pale smoky throughout; posterior crossvein perpendicular to vein M.

**Abdomen.** Brown, darker brown on posterior margins, with short black hairs dorsally on each tergite; tergal interstices whitish; sternites pale brown. Hypopygium brown with paler brown cerci, not dissected.

**Female.** Unknown.

**Types.** *Holotype* ♂ (BPBM Type 16,641) [BPBM1013180] and 3♂ [BPBM1013181] *paratypes* (one headless) from FRENCH POLYNESIA: **Marquesas:** FATU HIVA: North Branch Omoa River, 400–500 ft [122–152 m], 26 Aug 2001, riffles, pools, R.A. Englund (see Fig. 10). *Other paratype:* FRENCH POLYNESIA: **Marquesas:** FATU HIVA: 1♂ [BPBM1013182], Omoa River, 1000–1320 ft [328–402 m], 28 Aug 2001, cascade/pool, R.A. Englund; 1♂, Upper Omoa River, 1.6 mi [1 km] above Omoa, 10°30'31"S, 138°39'46"W, 26 Aug 2008, skating on surface of stream pools, D.A. Polhemus. Holotype and paratypes in BPBM.

**Etymology.** Named in honor of friend and colleague, Ronald Englund, for his successful efforts at collecting new and unusual riparian dolichopodids throughout French Polynesia over the last couple of decades.

### *Campsicnemus plautus* Evenhuis, new species

(Figs. 7, 16)

**Diagnosis.** Most similar in appearance to *C. englundii*, **n. sp.** from Fatu Hiva but can be distinguished from it by the flared mid basitarsus (mid basitarsus thick but cylindrical apically in *C. englundii*) and the uniform length of the setae on the anterior surface of the mid tibia (these setae scattered and long in *C. englundii*).

**Description. Male.** Body length: 2.4 mm. Wing length: 2.6 mm.

**Head.** Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel

conical, length about 1.5 x width; arista slightly longer than head height.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to black throughout, with a few metallic bluish highlights laterally; thoracic setae black: 1 + 4 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem white, knob dark brownish black.

**Legs:** CI yellowish; remainder of legs (except yellow venter of basal three-fourths of FI) brown; foreleg unmodified, without MSSC; FII (Fig. 16) with strong, swollen area ventrally bearing rows of strong, stiff black setae ventrally, single long black seta subbasally; with prominent protuberance on apical one-third bearing strong thick black seta and small patch of finer setae, apex of FII with 3 strong black setae; FIII as in *C. gladiator*, with row of long setae on ventroapical surface and with row of long hairs on dorsoapical two-thirds (MSSC); TiII (Fig. 16) slightly swollen on apical three-fourths, thickest at middle, with row of stiff black setae on subbasal third on mesal surface, sparse stiff black setae on apical two-thirds of lateral surface (MSSC). TiIII with dense patch of strong stiff setae subbasoventrally, slightly curved apically, becoming shorter apically, dorsal surface with small hairs and only two long setae (one subbasally; the other near middle) (MSSC). Ilt1 (Fig. 14) slightly longer than Ilt2, distinctly flared apically, with row of small spicules dorsolaterally and short fine hairs ventrally; Ilt2 broad, rounded, subcylindrical, inserted apically on Ilt1, with row of stiff fine hairs ventrally. Remainder of leg segments without MSSC.

**Wing:** pale smoky throughout; posterior crossvein perpendicular to vein M.

**Abdomen.** Brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites pale brown. Hypopygium brown with paler brown cerci, not dissected.

**Female.** Unknown.

**Types.** *Holotype* ♂ (BPBM Type 16,639) [BPBM101252] from FRENCH POLYNESIA: **Marquesas:** HIVA OA: Upper Atuona Valley, Atikoua stream, 340 ft [103 m], 12 Aug 2001, splash zone, R.A. Englund (see Fig. 7). Holotype in BPBM.

**Etymology.** The specific epithet derives from the Latin *plautus* = broad, flat; referring to the relatively broad, flat, flared mid basitarsus of the male.

### The *hihiroa* group

(Marquesan eye-lash flies)

**Diagnosis.** This group is distinguished from the congeners by the mid basitarsus lacking an apical spur and bearing extremely long, thick setae. It is restricted to the island of Hiva Oa in the Marquesas. Two species from the Marquesas (*C. ee* and *C. ii*) also have long, thick setae on the mid basitarsus but possess a conspicuous hook-like process on the fore tibia, which places them in the *aa* group (see below).

**Common name:** The common name “Marquesan eye-lash flies” refers to the long thick setae on the mid basitarsus and the fact that “*hihiroa*” means “long eye-lash” in Tahitian.

#### Included species:

*Campsicnemus dytei* Evenhuis, **n. sp.** (Marquesas [Hiva Oa] ; holotype ♂ in BPBM, examined).

*Campsicnemus hihiroa* Evenhuis, **n. sp.** (Marquesas [Hiva Oa] ; holotype ♂ in BPBM, examined).

*Campsicnemus taratara* Evenhuis, **n. sp.** (Marquesas [Hiva Oa] ; holotype ♂ in BPBM, examined).

### Key to species of the *hihiroa* group

(based on males)

1. Fore tibia with 3 strong black setae medially on ventral surface (Fig. 17); Ilt1 with one pair of long black setae on basal half (Fig. 19)..... *dytei* Evenhuis, **n. sp.**
- Fore tibia without conspicuous strong black setae; Ilt1 with single strong black seta or two pairs of strong black setae ..... 2
2. Ilt1 with single long strong black seta and one short, finer wavy seta (Fig. 20)..... *taratara* Evenhuis, **n. sp.**

- . Ilt1 with two pairs of strong long black setae (Fig. 18)..... *hihiroa* Evenhuis, **n. sp.**

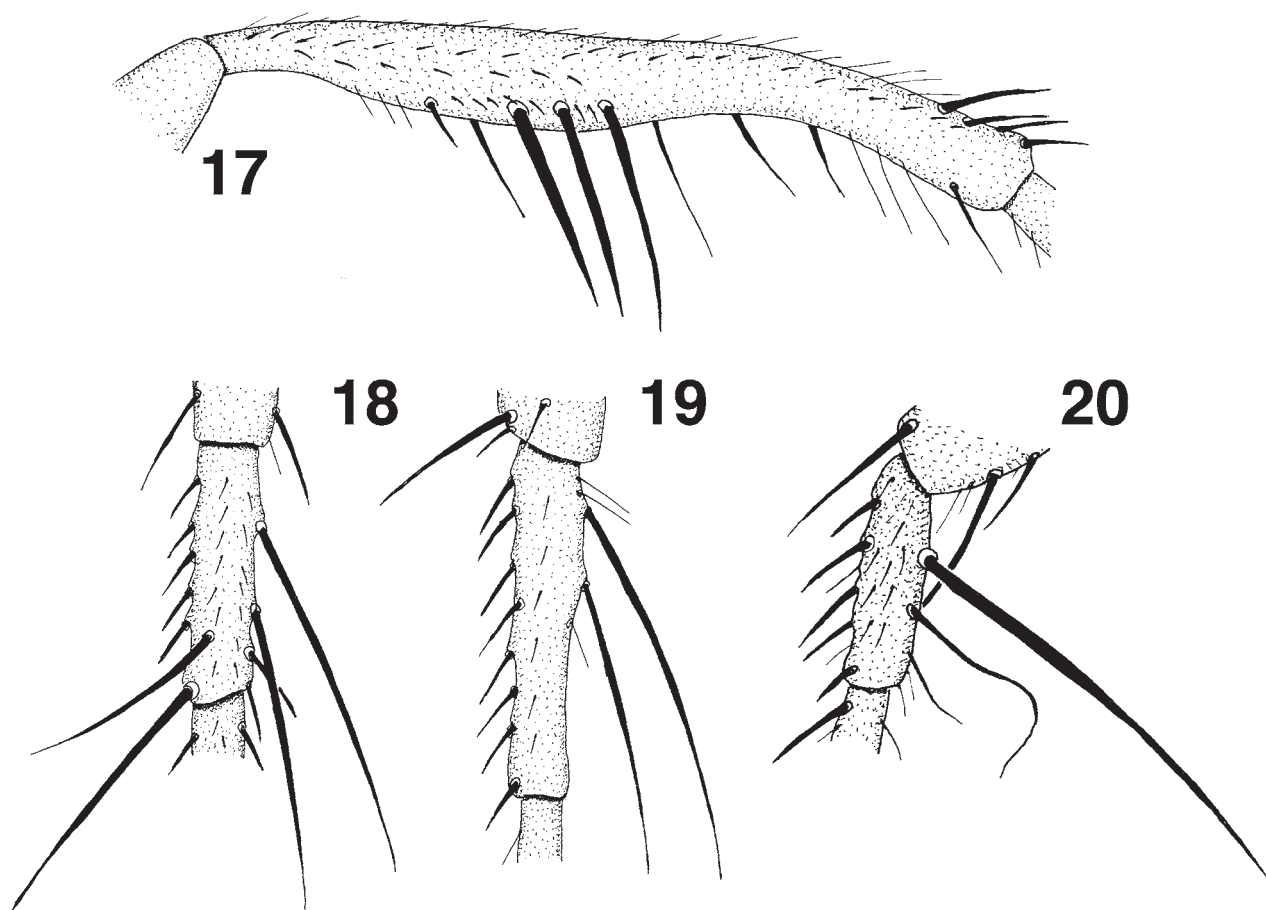
***Campsicnemus dytei* Evenhuis, new species**

(Figs. 12, 17, 19)

**Diagnosis.** Most similar in appearance to *C. hihiroa*, **n. sp.** but can be distinguished from it by the presence of one pair of strong long black setae on the mid basitarsus (two pairs present on the mid basitarsus in *C. hihiroa*).

**Description. Male.** Body length: 2.1 mm. Wing length: 1.8 mm.

**Head.** Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-half length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel short, conical, slightly less than width; arista slightly longer than head height.



**FIGURES 17–20.** *Campsicnemus hihiroa* group legs. 17. *C. dytei*, fore tibia. 18–20. Mid basitarsi. 18. *C. hihiroa*, **n. sp.**, 19. *C. dytei*, **n. sp.** 20. *C. taratara*, **n. sp.**

**Thorax:** Mesoscutum, scutellum, and pleura brown throughout, with a few metallic bluish highlights dorsolaterally, darker brown dorsomedially; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob white.

**Legs:** CI yellowish, CII brown, CII, pale brown; femora yellowish, FII yellowish brown apically; tibiae yellow basally; remainder of legs brown; TI (Fig. 17) slightly swollen medially on ventral surface, bearing 3 strong stiff black setae (MSSC), remainder of foreleg unmodified; FII with 2–3 strong black setae medially on

mesal surface; hind leg unmodified, without MSSC; TiII with 2 long setae on mesal surface (MSSC). IIt1 (Fig. 19) subequal in length to length of IIt2, with 2 very long strong black setae basally on mesal surface (length subequal to length of second tarsomere) (MSSC), row of shorter strong brown setae on lateral surface. Remainder of leg segments without MSSC.

*Wing*: pale smoky throughout; posterior crossvein perpendicular to vein M.

*Abdomen*. Tergites I, V–VI dark brown, tergites II–IV brown, all with short black hairs dorsally on each tergite; tergal interstices whitish; sternites yellowish brown. Hypopygium light brown with light brown cerci, not dissected.

**Female**. Unknown.

**Types**. *Holotype* ♂ (BPBM Type 16,635) [BPBM1013179] from FRENCH POLYNESIA: **Marquesas**: HIVA OA: Vaioa River, 1040 ft [317 m], 30 Aug 2001, riffle/pools, R.A. Englund. Holotype in BPBM.

**Remarks**. The apical hind tarsomeres of the holotype are broken off and missing.

**Etymology**. Named in honor of dolichopodid colleague, C.E. “Peter” Dyte, in thanks for the generous and valuable help and advice he has given me during my studies on Dolichopodidae over the years.

### ***Campsicnemus hihiroa* Evenhuis, new species**

(Figs. 13, 18)

**Diagnosis**. *Campsicnemus hihiroa* is characterized from other species in the *hihiroa* group by the two pairs of extremely long setae on the short, cylindrical mid basitarsus. The other species of this group have either one pair (*C. dytei*) or one long seta and one short way seta (*C. taratara*).

**Description**. **Male**. Body length: 2.7–2.9 mm. Wing length: 2.3–2.5 mm.

*Head*. Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-half length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel long, lanceolate-conical, length about 2.5 x width; arista slightly longer than head height.

*Thorax*: Mesoscutum, scutellum, and pleura brown throughout, with a few metallic bluish highlights dorsolaterally; thoracic setae black: 1 + 4 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob white.

*Legs*: CI yellowish, CII and CIII brown, slightly paler than surrounding pleura; FI and FII yellowish, FIII yellowish brown; remainder of legs brown; TI with apical tibial comb remainder of foreleg unmodified, without MSSC; FII with 4–5 strong black setae subbasally on ventral surface; hind leg unmodified, without MSSC; TiII with 4 long setae in middle and single strong, slightly sinuous seta subapically on mesal surface (MSSC), single strong setae apically on lateral surface. IIt1 (Fig. xx) short, about one-half length of IIt2, with 2 very long strong black setae on mesal surface (length subequal to second tarsomere), 2 shorter strong brown setae on posterolateral surface (MSSC). Remainder of leg segments without MSSC.

*Wing*: pale smoky throughout; posterior crossvein perpendicular to vein M.

*Abdomen*. Dark brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites yellowish brown. Hypopygium brown with paler brown cerci, not dissected.

**Female**. As in male except for lack of MSSC; postpedicel length about 1.5 x width; legs normal, without modifications; FI and FII brown.

**Types**. *Holotype* ♂ (BPBM Type 16,747) [BPBM1013201] and 3 ♀ [BPBM1013202] *paratypes* from FRENCH POLYNESIA: **Marquesas**: HIVA OA: Mt. Temetiu, 3680 ft [1121 m], 9°47'54"S, 139°04'44"W, 14 Aug 2001, yellow pan trap, R. Englund (see Fig. 13). *Other paratypes*: FRENCH POLYNESIA: **Marquesas**: HIVA OA: 2 ♂ [BPBM1013203], Mt. Temetiu, 3700 ft [1128 m], 14 Aug 2001, pyrethrin fog in mossy trees, D.A. Polhemus; 2 ♂ [BPBM1013204], Mt. Temetiu, 3400 ft [1036 m], 9°47'56"S, 139°04'45"W, 15 Aug 2001, mossy logs in gully, D.A. Polhemus; 1 ♂ [BPBM1013205], Mt. Temetiu, 3700 ft [1128 m], 9°47'56"S, 139°04'45"W, 14 Aug 2001, pyrethrin fog on mossy trees, D.A. Polhemus; 1 ♂ [BPBM1013206], Temetiu

Ridge, at trail crossing, 3650 ft [1112 m], 9°47'54"S, 139°04'44"W, 26 Oct 1999, mossy stems and branches, J.T. & D.A. Polhemus. Holotype in BPBM. Paratypes in BPBM and USNM.

**Etymology.** The specific epithet derives from the Tahitian *hihi* = “eye lash, whisker” + *roa* = “long”; referring to the long setae on the mid basitarsus.

### ***Campsicnemus taratara* Evenhuis, new species**

(Figs. 13, 20)

**Diagnosis.** Distinguished from its congeners in the *hihiroa* group by the short and swollen mid tibia bearing long black spines and the mid basitarsus bearing a single long seta and one short wavy seta (the other species in this group have one or two pairs of long setae).

**Description. Male.** Body length: 2.6 mm. Wing length: 2.2 mm.

**Head.** Black, face dark brown to black with reddish highlights, paler brown near clypeus; oc and vt black, about one-half length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending below eye in lateral view; antennal segments black to brown; postpedicel and arista broken off and missing.

**Thorax:** Mesoscutum, scutellum, and pleura brown throughout, with a few metallic bluish highlights dorsolaterally; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob white.

**Legs:** CI pale brown, remainder of legs brown; TI with 1 subapical and 1 apical tibial comb, remainder of foreleg unmodified, without MSSC; FII with 7 strong black setae on mesal surface; hind leg unmodified, without MSSC; TiII swollen with greatest width at apical one-third, with 2 long setae mesally and single strong seta subbasally on lateral surface (MSSC), single strong setae apically on lateral surface. IIt1 (Fig. xx) short, about one-fourth length of IIt2, with 1 very long strong black setae (length subequal to second tarsomere) and 1 short wavy black seta on mesal surface (MSSC). Remainder of leg segments without MSSC.

**Wing:** pale smoky throughout; posterior crossvein perpendicular to vein M.

**Abdomen.** Brown with short black hairs dorsally on each tergite; tergal interstices whitish; sternites yellowish brown. Hypopygium brown with paler brown cerci, not dissected.

**Female.** Unknown.

**Types.** Holotype ♂ (BPBM Type 16,755) [BPBM101306] from FRENCH POLYNESIA: **Marquesas:** HIVA OA: Mt. Temetiu, 3400 ft [1036 m], 9°47'56"S, 139°04'45"W, 15 Aug 2001, mossy logs in gully, D.A. Polhemus (see Fig. 13). Holotype in BPBM.

**Etymology:** The specific epithet derives from the Tahitian *taratara*, meaning “spear, thorn”; referring to the characteristic long black spines on the mid tibia.

### **The *aa* group**

(Marquesan vowel flies)

**Diagnosis.** Members of this species are easily distinguished from other Pacific *Campsicnemus* by the modification of the apex of the fore tibia (prominent hook-like or pad-like structures) (Figs. 23–27). The group is endemic to the more northerly islands of the Marquesas (see Fig. 1).

**Common name:** The “Marquesan vowel flies” are so named because of the fact that all five species are named after double vowel words in the Marquesan language.

#### **Included species:**

***aa* Evenhuis, n. sp.** (Marquesas [Nuku Hiva] ; holotype ♂ in BPBM, examined).

***ee* Evenhuis, n. sp.** (Marquesas [Ua Pou] ; holotype ♂ in BPBM, examined).

***ii* Evenhuis, n. sp.** (Marquesas [Nuku Hiva] ; holotype ♂ in BPBM, examined).



**oo** Evenhuis, **n. sp.** (Marquesas [Nuku Hiva] ; holotype ♂ in BPBM, examined).

**uu** Evenhuis, **n. sp.** (Marquesas [Ua Huka] ; holotype ♂ in BPBM, examined).

### Key to species in the *aa* group

(based on males)

1. Fore tibia with swollen area on apical 3/5 bearing long black setae or strong spike-like setae (e.g., Figs. 21–22)..... 2
- Fore tibia straight or slightly flared apically, not bearing long black setae or strong spike-like setae on swollen area; process of fore tibia short (as wide or shorter than width of tibia), pad-like (Figs. 25–26) ..... 4
2. Mid femur with two strong spines medially on lateral surface; apical process of fore tibia less than two times width of tibia (Figs. 24–27)..... 3
- Mid femur lacking strong spines medially on lateral surface; fore tibia with bulge in middle bearing row of short stiff spines (Fig. 21); apical process of mid tibia two times apical width of tibia (Fig 23) ... (Nuku Hiva).....  
..... **aa** Evenhuis, **n. sp.**
3. Fore tibia with strong black seta on apex of apical hook-like process (Fig. 24); mid basitarsus shorter than second tarsomere, bearing two long stiff thick black setae and long wavy hairs basally ... (Ua Pou) ..... **ee** Evenhuis, **n. sp.**
- Fore tibia without seta at apex of apical process (Fig. 27); mid basitarsus not as above ... (Ua Huka) .....  
..... **uu** Evenhuis, **n. sp.**
4. Fore tibia with fine hairs at tip of apical process (Fig. 26); mid tibia swollen apically with rows of thick, black spines; It2 with long fine hairs ... (Nuku Hiva)..... **oo** Evenhuis, **n. sp.**
- Fore tibia without fine hairs at tip of apical process (Fig. 25); mid tibia, long, thin, not swollen apically; It2 with normal fine setae ... (Nuku Hiva)..... **ii** Evenhuis, **n. sp.**

### *Campsicnemus aa* Evenhuis, new species

(Figs. 21, 23)

**Diagnosis.** This species is similar to *C. ee* in the *aa* group by the presence of a prominent hooked apex on the fore tibia but can be separated from it by the fore tibia with a bulge medially bearing dense short stiff spines (this bulge with long spiky setae in *C. ee*).

**Description. Male.** Body length: 3.4 mm. Wing length: 3.4 mm.

**Head.** Black, face dark brown to black with reddish highlights, dark brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending slightly below eye in lateral view; scape and pedicel dark brown; postpedicel yellow, short, conical, length subequal to width; arista slightly longer than head height.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to brown throughout, with a few metallic bluish highlights dorsolaterally; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob white.

**Legs:** CI yellowish, CII and CIII brown; FI and FII yellowish brown, FIII yellowish brown basally, becoming darker brown on apical one-fourth; remainder of legs yellowish brown; femora unmodified, without MSSC; TiI (Fig. 21) swollen just beyond middle on ventral surface, with large hook-like process apically, length of hook-like process more than 2 x width of tibia, swollen area with dense, short stiff setae, apical hook-like process with dense tibial comb (pecten) (MSSC), remainder of foreleg unmodified; TiII slightly thicker medially, with regular rows of short strong setae on dorsal surface (MSSC). TiIII unmodified. Remainder of leg segments without MSSC.

**Wing:** pale smoky throughout; posterior crossvein perpendicular to vein M.

**Abdomen.** Dark brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites yellowish brown. Hypopygium dark brown with paler brown cerci, not dissected.

**Female.** Unknown.

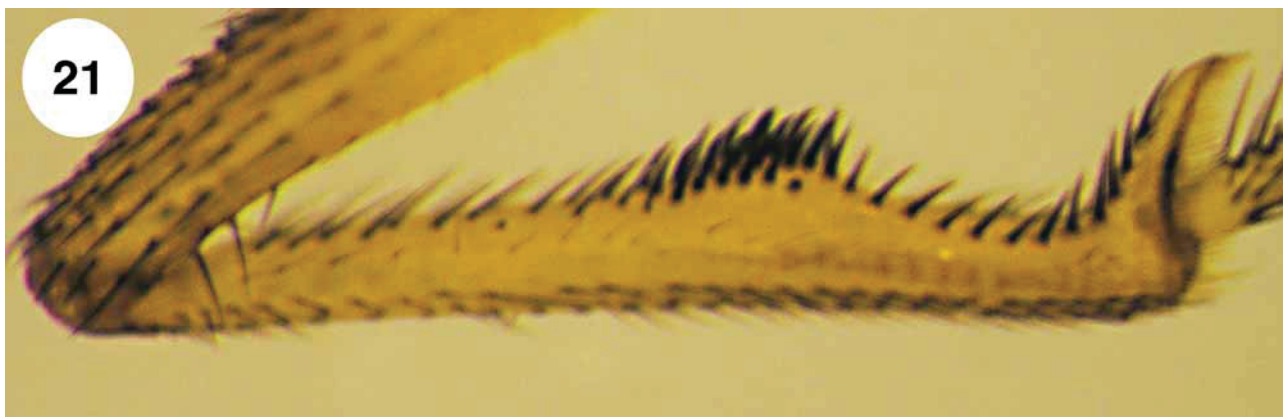
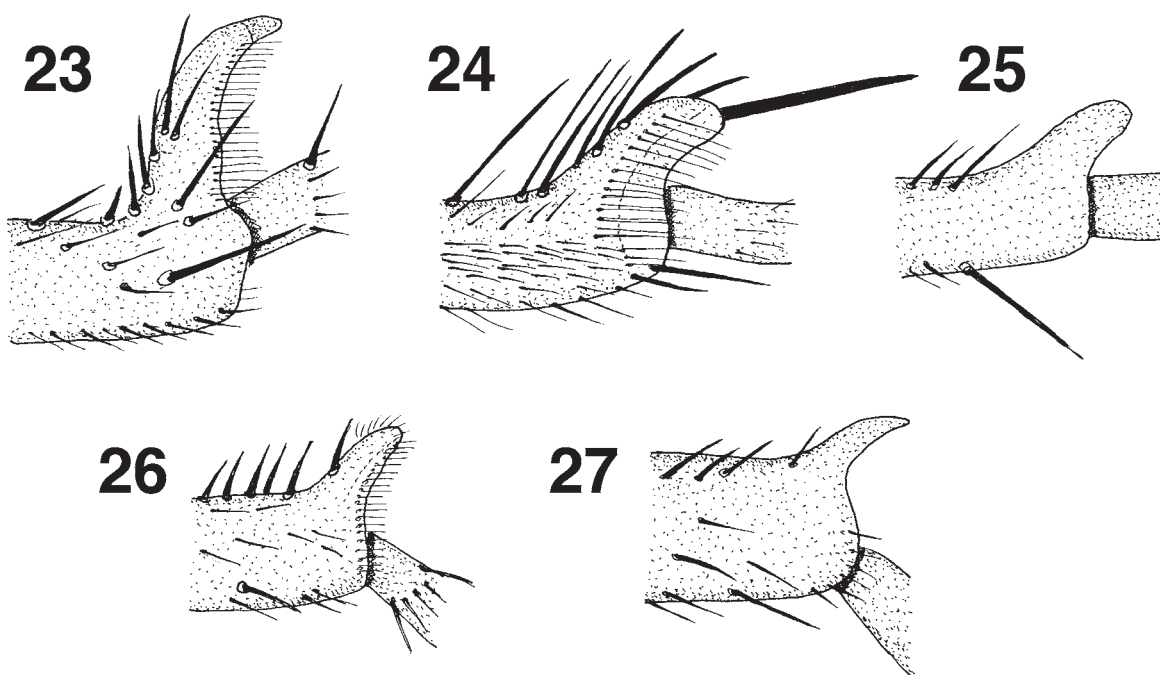


FIGURE 21–22. *Campsicnemus aa* group fore tibiae, mesal view. 21. *C. aa*, n. sp. 22. *C. ee*, n. sp.



FIGURES 23–27. *Campsicnemus* apices of fore tibiae showing hook-like process and setal arrangement. 23. *C. aa*, n. sp. 24. *C. ee*, n. sp. 25. *C. ii*, n. sp. 26. *C. oo*, n. sp. 27. *C. uu*, n. sp.

**Types.** *Holotype* ♂ (BPBM Type 16,757) [BPBM1013200] from FRENCH POLYNESIA: **Marquesas:** NUKU HIVA: Tekau Ridge, 3800–4000 ft [1158–1220 m], 8°31'59"S, 140°10'24"W, 21 Oct 1999, J.T. & D.A. Polhemus. Holotype in BPBM.

**Etymology.** The specific epithet derives from the Marquesan 'a'a = defender. The name is treated as a noun in apposition.

***Campsicnemus ee Evenhuis, new species***  
(Figs. 22, 24)

**Diagnosis.** Distinguished from other members of the *aa* group by the strong apical seat on the hook-like process of the fore tibia and the strong long black setae on the swollen medial area of the ventral surface of the fore tibia.

**Description. Male.** Body length: 3.2 mm. Wing length: 2.6 mm.

**Head.** Black, face dark brown to black with reddish highlights, dark brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending slightly below eye in lateral view; scape and pedicel dark brown; postpedicel brown, short, conical, length subequal to width; arista slightly longer than head height.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to brown throughout, with a few metallic bluish highlights dorsolaterally; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob white.

**Legs:** CI yellowish, CII and CIII brown; FI and FII yellowish brown, FIII yellowish brown basally, becoming darker brown on apical one-fourth; remainder of legs yellowish brown; FII with 2 strong black setae, one medially on ventral surface, one on apical one-third of ventral surface, remainder of femora unmodified, without MSSC; TiI (Fig. 22) slightly thicker just beyond middle on ventral surface, with large hook-like process apically, length of hook-like process subequal to width of tibia, swollen area with 4 long, strong, stiff setae, apical hook-like process (Fig. 24) with dense tibial comb (pecten) and bearing strong stiff black seta at tip (MSSC), remainder of foreleg unmodified; TiII slightly bowed and swollen, with long seta medially on dorsal surface and one subapically (MSSC). IIt1 about one-half length of IIt2, with 2 long black curved setae laterally, their length subequal to IIt2, and with dense wavy setae on mesal surface; Iit2 with row of long wavy setae on mesal surface, length subequal to segment. Remainder of leg segments without MSSC.

**Wing:** pale smoky throughout; posterior crossvein perpendicular to vein M.

**Abdomen.** Brown, dark brown along posterior margin, with short black hairs dorsally on each tergite, a few longer hairs laterally; sternites yellowish brown. Hypopygium dark brown with brown cerci, not dissected.

**Female.** As in male except for lack of MSSC; postpedicel length about 1.5 x width; legs normal, without modifications.

**Types.** *Holotype* ♂ (BPBM Type 16,629) [BPBM1013140] and 2♀ *paratypes* [BPBM1013141] from FRENCH POLYNESIA: **Marquesas:** UA POU: Anakooma River, 1300 ft [396 m], cascade, sweep wall, 19 Aug 2001, R.A. Englund. *Other paratype:* FRENCH POLYNESIA: **Marquesas:** UA POU: 1♂ [BPBM1013142], Paeoa River, 1150–1500 ft [350–457 m], 17 Aug 2001, pools/cascades, R.A. Englund. Holotype and paratypes in BPBM.

**Etymology.** The specific epithet derives from the Marquesan 'e'e = "disappeared"; referring to the relative cryptic nature of the species, only being found in samples after collection of a number of flies from the same locality. The name is treated as a noun in apposition.

### ***Campsicnemus ii* Evenhuis, new species**

(Fig. 25)

**Diagnosis.** Fits closest to *C. oo*, **n. sp.** but is distinguished from that species by the long, thin, unswollen mid tibia (mid tibia normal in length and swollen apically in *C. oo*).

**Description. Male.** Body length: 1.9–2.1 mm. Wing length: 2.0–2.3 mm.

**Head.** Black, face dark brown to black with reddish highlights, dark brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending slightly below eye in lateral view; antennal segments brown; postpedicel long, lanceolate-conical, length 3 x width; arista slightly longer than head height.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to brown throughout, with a few metallic bluish and bronze highlights dorsolaterally and laterally; thoracic setae black: 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob yellowish white.

**Legs:** CI yellowish, CII and CIII brown; remainder of legs yellowish; femora unmodified, without MSSC; TiI (Fig. 25), with large pad-like process apically, length of pad-like process subequal to width of tibia, apical pad-like process rounded (MSSC), remainder of foreleg unmodified; TiII slightly thicker medially, with 2 strong setae on dorsal surface, single strong zigzagged seta just before middle on dorsomedial surface (MSSC). TiIII unmodified. Remainder of leg segments without MSSC.

**Wing:** pale smoky throughout; posterior crossvein perpendicular to vein M.

**Abdomen.** Dark brown with short black hairs dorsally on each tergite, a few longer hairs laterally; tergal interstices whitish; sternites yellowish brown. Hypopygium dark brown with paler brown cerci, not dissected.

**Female.** As in male except for absence of MSSC; postpedicel short, length subequal to width.

**Types.** *Holotype* ♂ (BPBM Type 16,653) [BPBM101241] from FRENCH POLYNESIA: **Marquesas:** NUKU HIVA: Toovii, Oomu, 900 m [274 m], 16–19 Jul 1977, on mushroom fungus, S.L. Montgomery. *Paratypes:* 1♂, 1♀ [BPBM101242], NUKU HIVA: ridge towards Tekau, from Toovii, 850–1000 m [259–328 m], 8 Aug 1980, G. Paulay (specimens bleached). Holotype and paratypes in BPBM.

**Etymology.** The specific epithet derives from the Marquesan ‘i’i = “force, energy”. The name is treated as a noun in apposition.

### ***Campsicnemus oo* Evenhuis, new species**

(Fig. 26)

**Diagnosis.** Most similar in appearance to *C. ii*, **n. sp.** but can be separated from it by the apical process of the mid tibia with an tibial comb and fine hairs at tip (tibial comb and apical hairs absent in *C. ii*) and the swollen mid tibia with rows of black spines (mid tibia not swollen in *C. ii*).

**Description. Male.** Body length: 2.5 mm. Wing length: 2.9 mm.

**Head.** Black, face dark brown to black with reddish highlights, dark brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending slightly below eye in lateral view; scape and pedicel dark brown; scape length 2 x pedicel; postpedicel and arista broken off and missing.

**Thorax:** Mesoscutum, scutellum, and pleura dark brown to brown throughout, with a few metallic greenish highlights dorsally and dorsolaterally; thoracic setae black: 4 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob white.

**Legs:** CI yellowish, CII and CIII brown; remainder of legs yellowish; femora unmodified, without MSSC; TiI with large pad-like process apically, length of pad-like process subequal to width of tibia, ventral surface with short stiff spicule-like setae, apical pad-like process with tibial comb (pecten) and small patch of short



minute hairs at tip (MSSC), remainder of foreleg unmodified; TiII slightly thicker medially, with 4 strong setae on mesal surface, 7 strong spiky setae on dorsal surface (MSSC) admixed with short fine hairs. TiIII unmodified. Remainder of leg segments without MSSC.

*Wing*: pale smoky throughout; posterior crossvein perpendicular to vein M.

*Abdomen*. Dark brown with short black hairs dorsally on each tergite; sternites brown. Hypopygium dark brown with paler brown cerci, not dissected.

**Female**. Unknown.

**Types**. *Holotype* ♂ (BPBM Type 16,657) [BPBM101253] from FRENCH POLYNESIA: **Marquesas**: NUKU HIVA: Matauuna, 3760 ft [1146 m], 1 Aug 1929, sweeping, Mumford & Adamson, Pacific Entomological Survey. Holotype in BPBM.

**Etymology**. Derives from the Marquesan 'o'o = "rubbed, grated"; referring to the incomplete nature of the holotype with broken setae and hairs on the mesonotum and tergites. The name is treated as a noun in apposition.

### ***Campsicnemus uu* Evenhuis, new species**

(Figs. 9, 27)

**Diagnosis**. Distinguished from other members of the *aa* group by sharp, pointed and bare apical process of the fore tibia (hook-like or pad like, and/or with hairs in the other species in the *aa* group) and the two conspicuous strong black setae on the mesoventral surface of the mid femur (these setae absent in the congeners in this species group).

**Description**. **Male**. Body length: 1.7–1.8 mm. Wing length: 1.8–1.9 mm.

*Head*. Black, face dark brown to black with greenish highlights, dark brown near clypeus; oc and vt black, about one-third length of antennal arista; front, occiput, and vertex black with blue highlights; face constricted at middle, almost holoptic, eyes separated below antennae by width of 1–2 ommatidia; palp small, dark brown; proboscis brown, extending slightly below eye in lateral view; antennal segments brown; postpedicel long, lanceolate-conical, length 3 x width; arista slightly longer than head height.

*Thorax*: Mesoscutum, scutellum, and pleura brown throughout, with a few metallic bluish highlights dorsolaterally; thoracic setae black: 1 + 3 dc; 2 np; 2 ph; 1 pa; 1 + 1 sc; ac absent; halter stem and knob white.

*Legs*: CI yellowish, CII and CIII brown; FI and FII yellowish brown, FIII yellowish brown basally, becoming darker brown on apical one-fourth; remainder of legs yellowish brown; femora unmodified, without MSSC; FII yellow, with 2 strong black setae mesally on ventral surface (MSSC); TiI with hook-like process apically (Fig. 27), length of hook-like process less than width of tibia, row of short stiff setae subapically, apical hook-like process bare; remainder of foreleg unmodified; TiII slightly thicker medially, with regular rows of short strong setae on dorsal surface (MSSC). TiIII unmodified. Remainder of leg segments without MSSC.

*Wing*: pale smoky throughout; posterior crossvein perpendicular to vein M.

*Abdomen*. Brown, darker brown on posterior margins, with short black hairs dorsally on each tergite, tergal interstices whitish; sternites yellowish brown, darker apically. Hypopygium dark brown with paler brown cerci, not dissected.

**Female**. As in male except for lack of MSSC; postpedicel length about 1.5 x width; legs normal, without modifications.

**Types**. *Holotype* ♂ (BPBM Type 16,666) [BPBM101308] and 1♀ *paratype* [BPBM101309] from FRENCH POLYNESIA: **Marquesas**: UA HUKA: Hitikau Ridge, 2900 ft [884 m], 2 Nov 1999, D.A. Polhemus (see Fig. 9). *Other paratypes*. FRENCH POLYNESIA: **Marquesas**: UA HUKA: 2♂ [BPBM101310], Hitikau Ridge, 2500 ft [762 m], 3 Mar 1931, sweeping over grasses, LaBronnec & H. Tauraa, Pacific Entomological Survey; 1 ♂ (damaged) [BPBM101311], Vaipaea Cascade, 680 ft [207 m], 3 Nov 1999, R.A. Englund. Holotype and paratypes in BPBM.



**Remarks.** The characteristic two strong mid femoral setae are missing in the holotype (sockets are visible) but are present in two of the three male paratypes.

**Etymology.** The specific epithet derives from the Marquesan ‘u‘u = “tremble, shake, stutter”. The name is treated as a noun in apposition.

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